

# WASTEWATER OPERATOR EXAMINATION STUDY KEY

## CLASS C AND CLASS D

### For Class C:

Manuals used for examination questions are prepared by and available through California State University, Sacramento College of Engineering and Computer Science, Office of Water Programs (Referred to hereafter as the Sacramento manuals).

Web site: <http://www.owp.csus.edu/> Email: <mailto:wateroffice@csus.edu/>

Categories of test questions which will be covered by the Sacramento manuals and the percentage of the examination questions comprised from that area are listed below:

*Activated Sludge* 3-5%

*Advanced Treatment* 3-5%

*Clarifiers* 4-5%

*Industrial Treatment* 25%

*Laboratory* 10%

*Maintenance* 5%

*Preliminary treatment* 5%

*Safety* 5%

*Solids Handling* 10%

(NOTE: These percentages are approximate)

Study these chapters:

### **Industrial Waste Treatment – Volume I**

*Chapter 1* The Industrial Plant Operator

*Chapter 2* Safety

*Chapter 3* Regulatory Requirements

*Chapter 4* Preventing and Minimizing Wastes at the Source

*Chapter 5* Industrial Wastewaters

*Chapter 6* Flow Measurement

*Chapter 7* Preliminary Treatment

*Chapter 8* Physical-Chemical Treatment Processes

*Chapter 9* Filtration

*Chapter 10* Physical Treatment Processes

*Chapter 11* Treatment of Metal Wastestreams

### **Industrial Waste Treatment – Volume II**

*Chapter 3* Activated Sludge Process Control

*Chapter 4* Sequencing Batch Reactors

*Chapter 7* Residual Solids Management

### **Operation of Wastewater Treatment Plants – Volume II**

*Chapter 16* Laboratory Procedures and Chemistry

*Chapter 18* Analysis and Presentation of Data

*Chapter 19* Records and Report Writing

# WASTEWATER OPERATOR EXAMINATION STUDY KEY

## CLASS C AND CLASS D

### *Mathematics* 10 – 15 %

Web site for the Class C and D Formula Sheet:

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_study\\_guide\\_formula\\_sheet.pdf](https://www.in.gov/idem/cleanwater/files/wastewater_cert_study_guide_formula_sheet.pdf)

Any mathematics problem given on the examination will have the appropriate formula listed on the Formula Sheet furnished with the exam on that day. It is recommended that you look over the formula sheets and work any problems in the Sacramento manuals.

Solving these problems involve plugging the numbers given in the problem into the correct formula and calculating the answer.

There are a few basic rules that apply to solving formulas:

1. Work from left to right
2. Do all of the multiplication and division above the line (in the numerator) and below the line (in the denominator); then do the addition and subtraction above and below the line.
3. Perform the division (divide the numerator by the denominator).
4. Parentheses ( ) are used in formulas to identify separate parts of a problem.  
Work the arithmetic within the parentheses before working outside the parentheses.  
Use the same order stated in rules 1, 2, and 3 above when working inside of parentheses.

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### *Pretreatment* 5%

Questions are taken from the **Introduction to the National Pretreatment Program** manual, available on-line from US EPA at:

[http://www.epa.gov/npdes/pubs/pretreatment\\_program\\_intro\\_2011.pdf](http://www.epa.gov/npdes/pubs/pretreatment_program_intro_2011.pdf)

and

**Industrial Waste Treatment, Volume I:**

**Chapter 3** Regulatory Requirements

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### *Rules/Regulations/Completing reports* 20%

The remainder of the examination questions will cover Rules and Regulations located in **Part II, Section One, of the Wastewater Certification Manual** and questions related to completion of the Discharge Monitoring Report (DMR) and the Monthly Report of Operation (MRO). A worksheet and necessary additional documents may be printed from IDEM's Web site.

Link to the Certification Manual:

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_manual.pdf](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_manual.pdf).

Link to the worksheet for the DMR and MRO. Note that there are four (4) documents to print:

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_worksheet.doc](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_worksheet.doc)

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_worksheet\\_ref\\_permit.doc](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_worksheet_ref_permit.doc)

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[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_worksheet\\_ref\\_mro.xls](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_worksheet_ref_mro.xls)

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*Advanced Treatment* 3-5%

*Clarifiers* 3-5%

*Industrial Treatment* 25%

*Laboratory* 10%

*Maintenance* 5%

*Preliminary treatment* 5%

*Safety* 5%

*Solids Handling* 10-12%

(NOTE: These percentages are approximate)

Study these chapters:

### **Industrial Waste Treatment – Volume I**

*Chapter 1* The Industrial Plant Operator

*Chapter 2* Safety

*Chapter 3* Regulatory Requirements

*Chapter 4* Preventing and Minimizing Wastes at the Source

*Chapter 5* Industrial Wastewaters

*Chapter 6* Flow Measurement

*Chapter 7* Preliminary Treatment

*Chapter 8* Physical-Chemical Treatment Processes

*Chapter 9* Filtration

*Chapter 10* Physical Treatment Processes

*Chapter 11* Treatment of Metal Wastestreams

### **Industrial Waste Treatment – Volume II**

*Chapter 3* Activated Sludge Process Control

*Chapter 6* Anaerobic Treatment

*Chapter 7* Residual Solids Management

### **Operation of Wastewater Treatment Plants – Volume II**

*Chapter 16* Laboratory Procedures and Chemistry

*Chapter 17* Applications of Computers for Plant O&M

*Chapter 18* Analysis and Presentation of Data

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and

**Industrial Waste Treatment**, Volume I:

***Chapter 3*** Regulatory Requirements

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[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_worksheet\\_ref\\_permit.doc](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_worksheet_ref_permit.doc)

[https://www.in.gov/idem/cleanwater/files/wastewater\\_cert\\_booklist\\_10\\_worksheet\\_ref\\_dmr.pdf](https://www.in.gov/idem/cleanwater/files/wastewater_cert_booklist_10_worksheet_ref_dmr.pdf).

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